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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,346	02/06/2004	Densen Cao	5125 P	5248
7590 Parsons Behle & Latimer Suite 1800 201 South Main Street P.O. Box 45898 Salt Lake City, UT 84111		07/02/2007	EXAMINER MAY, ROBERT J	
			ART UNIT 2885	PAPER NUMBER
			MAIL DATE 07/02/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/774,346

Applicant(s)

CAO ET AL.

Examiner

Robert May

Art Unit

2885

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 12-19 and 22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-19 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6, 8-9, 12-13, 15-16, 18-19, & 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanley in view of Hochstein, Hartley, Koehler and Kamakura (5,578,156).

Regarding Claims 1 and 16, Hanley discloses in Figure 13 a light which could be used by a miner having forward illumination using semiconductor chips 1330 and a remote power source 1350 that is of a non-sparking nature so that the apparatus can be worn by a firefighter when entering flammable combustible environments (Col 10, Lines 38-42). Hanley fails to disclose a semiconductor chip mounted to heat sink comprising a primary and dissipating heat sink with the secondary heat sink having an internal volume greater than the primary heat sink. Hochstein discloses in Figure 2, an LED 12 affixed to a primary heat sink 18 which is attached to a heat dissipating heat sink 32, 30 where the dissipating heat sink is configured as fins 32 where the dissipating heat sink 32, 30 has a greater internal volume than primary heat sink 18 in order to maintain the light output of the LED package when the LED apparatus is used in critical situations where the reduction in luminous output can have dire consequences (Col 1, Lines 38-

43) such as within a flammable mine environment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LEDs of Hanley's front illuminating fireman's helmet with the LED heat sink assembly of Hochstein so that illumination of the LEDs can be maintained in critical safety situations.

Regarding Claims 1, Hanley fails to disclose a wavelength shifting coating on the chip for converting the monochromatic light emitted to white light. Hartley discloses a flashlight wherein the LED is coated with a phosphor coating which acts to convert the emitted light to a white light (Col 14, Lines 1-3) in order to produce a white light for general illumination purposes. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LEDs of Hanley with a phosphor coating to produce a white light for general illumination purposes.

Regarding Claim 1, Hanley discloses a remote power source 1350 which is construed as a battery located on a remote location from the light source 1330 on the helmet, but fails to disclose this as a battery pack with a battery sealed within. Koehler discloses in Figures 1 & 6, a waterproof battery and lamp apparatus where the battery is sealed within case 15 so as to avoid exposure of the battery to a wet environment such as mining environment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the remote battery of Hanley with a battery pack sealing the battery within as disclosed by Koehler so as to prevent exposure of the battery to a wet environment such as a mining environment.

Regarding Claims 1, 12 and 22 Hanley fails to disclose the semiconductor chip including epitaxial layers located on a substrate made from a material selected from a group consisting GaAs, ZnS, ZnSe, InP, Al₂O₃, Sic, GaSb, and InAs. Kamakura discloses a light apparatus comprising a light module including a semiconductor material including a chip which includes epitaxial layers located on a substrate made from GaAs, InP for emitting the light at a particular wavelength (Col 1, lines 13-18 and Col 3, lines 53-60). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the light module of Hanley with the semiconductor chip having epitaxial layers located on a substrate made from GaAs or InP for emitting the light at a particular wavelength.

Regarding Claims 2 & 12, and 22, Hanley fails to disclose an airtight magnetic switch for activating the light source. Koehler discloses in Figures 1 and 6, an air and water tight switch mechanism a lighting apparatus having an electrically conductive ferromagnetic element shiftable in a capsule which shifts in response to the shifting of a magnetic switch (Col 2, Lines 48-52) that protects the circuitry from a wet environment such as within a mining environment. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the switch of Hanley with magnetic switch of Koehler so that the circuitry is protected from a wet environment.

Regarding Claims 3 & 13, Hanley fails to disclose a device with a second remote battery pack. It would have been obvious to one of ordinary skill in the art to have a second remote battery pack as a backup power source to the first battery pack and

since there is no new and unexpected result attributed to this 2nd battery pack, it is considered unpatentable see *In re Harza*, 274 F.2d 669.

Regarding Claims 6 & 15, Hanley fails to disclose a device with a heat sink assembly where there is heat conductive adhesive between the primary and dissipating heat sinks. Hochstein discloses a heat sink for an LED with the heat sink assembly as recited in Claims 1 & 12 and the use of a conductive epoxy to bond the primary heat sink 18 to heat sink dissipater 32, 30 as a practical means for thermally coupling heat sinks together (Col 5, Lines 13-16). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use thermally conductive adhesive coupling the heat sinks together as a practical means to do so.

Regarding Claims 8 & 18 Hanley fails to disclose the light source 1330 as being either (LED chips, LED Chip arrays, laser diodes, vertical cavity surface emitting lasers, VCSEL arrays, edge emitting lasers, surface emitting lasers and photon recycling devices. Hochstein discloses in Figure 2 an LED chip 12 that is suitable for mounting to a heat sink as disclosed. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the LED of Hanley with the LED chip of Hochstein so that it can be mounted to a Heat sink surface.

Regarding Claim 9 and 19 Hanley fails to disclose heat sinks wherein one of said heat sinks includes material selected from the group consisting of copper, aluminum, silver, magnesium, steel silicon carbide, boron nitride, tungsten, molybdenum, cobalt, chrome, Si, SiO₂, SiC, AlSi, AlSiC, and diamond. Hochstein discloses using a plated copper diamond material for drawing heat away from an LED die (junction) to a heat

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dissipater to reduce the temperature and extend the life of the LED Package (Col 1, Lines 55-58). Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Hanley with a heat sink assembly comprising copper plated diamond so that heat may be drawn away from the LED die (junction) to the heat dissipater.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanley, Hochstein, Hartley, Koehler and Kamakura as applied to claim 3 above, and further in view of Parker. Hanley fails to disclose a strap for securing the battery packs on opposite sides of said helmet. Parker discloses in Figure 4, a device comprising a battery 15 strapped to the helmet using a strap 17 that can strap the two batteries to opposite sides of the helmet. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have a strap as taught by Parker for strapping two batteries to opposite sides of the helmet.

Claims 5, 7, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanley, Hochstein, Hartley, Koehler and Kamakura as applied to Claims 1 and 12 above, and further in view of Kish. Hanley fails to disclose a reflector in the light module or a light reflective adhesive between the semiconductor chip and the primary heat sink. Kish discloses in Figure 2 a reflector comprising a silver loaded reflective epoxy which affixes an LED to a reflector cup in order to reflect the light from the LED's back surface and improve the intensity of the light (Col 3, Lines 65+).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the integrated LED heat sink of Hanley, Hochstein, Hartley and Koehler with the reflector comprising a reflective epoxy of Kish in order to improve the intensity of the light emitted.

Response to Arguments

Applicant's arguments with respect to claims 1, 12 and 22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert May whose telephone number is (571) 272-5919. The examiner can normally be reached between 9 am– 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong (James) Lee can be reached on (571) 272-7044. The fax number for the organization where this application or proceeding is assigned is (571) 273-8300 for all communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval PAIR system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RM

6/24/07


JONG-SUK (JAMES) LEE
SUPERVISORY PATENT EXAMINER